



Doctor Cockburn's Solution of His Problem for determining the proper Doses of Purging, and Vomiting Medicins in every Age of a Man, in every Constitution, in every Change of Constitution all over the World; which was proposed by him, in the Philosophical Transactions, last March.

IN order to determine rightly the Different Doses of Vomiting, and Purging Medicins that are requisite according to the different Ages, and Constitutions of Men; we must suppose, *First*, that these Medicins do not perform their Operation, before they get into the Mass of Blood, and mix themselves with it: for we find that, if They are not Nauseous, they produce no sensible effect untill such a time as is necessary for that purpose. *Secondly*, that their general effect is the Alteration of the Temperament of the Blood, and all other circulating Liquors.

From these two Postulata we infer, that where there is the same Crasis of the Blood the Doses of Medicins necessary to produce a

determin'd effect must always be as the quantity of the Blood: for if it require a determin'd dose to alter the Crasis, for example, of one Pound of Blood to a certain degree, it will require a double dose to alter two pound to the same degree, a triple dose will be requisite to produce the same effect in three Pound of Blood, &c. and Universally, if the quantity of Blood b requires the dose d , the quantity of Blood mb will require the dose md ; and $b : d :: mb : md$.

Coroll. Since the Blood and all other circulating Liquors of the Body may be generally estimated by the Weight of the Animal (for what we call solid parts are only Canals for containing those Liquors) it follows that, *Cæteris paribus*, the quantity of the doses ought always to be proportional to the weight of the Body; and therefore, the dose of these Medicins to be given a Child new born is to the dose of the same Medicins that are fit for Men of full growth, as the weight of a Child to the weight of a Man. For instance, xxx Grains of *Pil. Rudii* is the common Dose for a Man, and the Weight of a Man, one with another, may be reputed 160 pound weight, and the weight of a New-born Infant may be reputed 12 pound: now as 160 the weight of a Man is to 12 the weight of a Child,

so

so is 30 Grains the ordinary dose for a Man to 2½ Grains which is the ordinary dose for a Child ; and always in the same proportion as the Child grows the doses of Physick, to be given it, ought to encrease, till about the age of Twenty or One and Twenty, when most people come to their full growth ; after which Age, the doses to be given continue the same till Men be past Fifty, from which time we may reckon that the quantity and force of the Blood do continually decrease, and the Doses of the Medicins ought to decrease in the same proportion.

In this method of reasoning, we have supposed all men of the same Constitution, and that their Encrease in proportion to their years, and their manner of Secretions were alike ; it being necessary to consider the thing, at first, in the most simple manner : but because the Temperament and Constitutions of Men are very different, according to the various Crases of their Blood and other circulating Liquors, the quantity of the Doses will not always be exactly in the same proportion with the weight of the Body. This different temperament of the Blood consists in a certain disposition its parts have to Cohere less or more one with another, by which the Blood becomes more or less fluid, and according to

the various degrees of Cohesion, the operation of Medicins, on the Blood, will be various. For, let us suppose two persons with equal quantities of Blood, but differing in degrees of Cohesion; it is plain that a Medicin will be easier mixt with the Blood whose parts are less coherent, than with That whose Parts are more firmly United together, and the proportion of this facility of mixing the parts of the Medicin with the parts of the Blood will be always Directly as the Fluidity, or Reciprocally as the Tenacity of the parts of the Blood, and the force of the Medicin upon the Blood will be likewise in the same proportion; and therefore, to have a Medicin act with equal force upon these two different persons, the doses to be given them must be always proportional to the Tenacity, or Thickness of their Blood, supposing the Blood in both to circulate with the same Velocity: but if the Velocity of the Blood be different, the operation of the Medicins, *h. e.* the quantity of the Secretions made by them, will be as the Velocities of the Blood; for, the Secretions made at any Gland, in a given time, is always as the quantity of Blood which comes to it in that time, *h. e.* as its Velocity. Now, *Cæteris paribus*, the Velocity of the Blood is always as its Fluidity, or Reciprocally,

cally as its degree of cohesion; and therefore, if the Velocity of the Blood were only to be considered, upon that account alone the quantity of the dose to be given, to produce the same effect, must be Directly as the degree of Cohesion in the parts of the Blood.

Prop. I.

In two Persons that have equal Quantities of Blood which differs in degrees of Cohesion, the quantity of the Doses of Vomiting, and Purging Medicines necessary to be given, in order to produce the same effect, must be in a Duplicat proportion of the degrees of Cohesion.

For where the Blood is moved with the same Velocity, the quantity of the dose must be as the degrees of Cohesion, and if the degrees of Cohesion were the same, the quantity of the dose must be reciprocally as the Velocity; and therefore where neither Cohesion nor Velocity are the same, the quantity of the Dose must be in a proportion Compounded of the direct proportion of the degrees of Cohesion in the parts of the Blood, and a reciprocal proportion of its Velocity: but the reciprocal proportion of the Blood's Velocity

Velocity is equal to the direct proportion of its tenacity, or degrees of Cohesion. Wherefore, the quantity of the dose, necessary to be given, is in a proportion compounded of the degrees of Cohesion, and the degrees of Cohesion, *h. e.* the doses to be given are in a duplicat proportion of the degrees of Cohesion. Q. E. D.

Prop. II.

The quantity of the Doses to be given to persons of different quantities of Blood, and which has different degrees of Cohesion, must be in a proportion compounded of the weight of the person and the duplicat proportion of the degrees of Cohesion in the Blood Conjunctly.

For where the degrees of Cohesion are the same, the quantity of the dose is as the weight of the person, and where the Weight of the person is the same, the quantity of the Dose must be in a duplicat proportion of the degrees of Cohesion; and therefore, when neither remain the same, the quantity of the Dose must be in a proportion compounded of the Weight of the Person, and the duplicat proportion of the degrees of Cohesion. Q. E. D.

Corol.

Corol. Hence, knowing the Quantity and Quality of the Blood in any Person, it is easy to determin the particular Doses necessary for either Purging or Vomiting him to a certain Degree. This Quality, or Temperament, of the Blood is easily determined by a Skilful Physician from the Pulse, Urine, and other Secretions; and therefore a Physician, by Observation on the Doses necessary to Purge Persons of a certain Constitution, may from thence determin the Doses requisit for Persons of any other Temperament, or Constitution.

Schol. What is already demonstrated would follow, in general, from the common Hypothesis of Physicians, about Purging and Vomiting; because the Disposition the Stomack and Intestins have to be Stimulated is as the mentioned Degrees of Quantity, and Cohesion of the Blood. So the thing is evident even upon that Supposition, though it has not the simplicity of a Postulatum, and was omitted on that account.

L O N D O N, Decemb. 5
1705.

F I N I S.

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W D & M Decemb 2
1751

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